# Biology

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## 2.1 – Biodiversity

**Definition:**
Biodiversity is the variety of organisms in a particular area.

**Important Points:**

1. Biodiversity means many kinds of organisms living in one place.
2. It depends on climate, height (altitude), and soil.
3. Tropical areas have more biodiversity than polar areas.
4. Scientists have found 2 million kinds, but many more are unknown.
5. Biodiversity is not the same in every place.

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## 2.1.1 – Importance of Biodiversity

**Important Points:**

1. Biodiversity keeps ecosystems stable and balanced.
2. It helps in **carbon cycle** and **nitrogen cycle**.
3. It helps in **climate regulation** by absorbing carbon dioxide.
4. It gives us food, medicine, fuel, and building materials.
5. It supports businesses like farming, tourism, and medicine.

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## 2.2 – Classification

**Definition:**
Classification is the process of grouping organisms based on similarities and differences.

**Important Points:**

1. About 2 million kinds of organisms are known.
2. Classification helps study and understand organisms.
3. It shows how organisms are related through evolution.
4. Modern classification uses genetics as well as physical traits.

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## 2.2.1 – Aims of Classification

1. To find similarities and differences among organisms.

2. To understand their evolutionary relationships.

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## 2.2.2 – Advantages of Classification

1. Helps in organizing and identifying organisms.
2. Explains relationships between species.
3. Assists in finding new species.
4. Provides a universal language for scientists.

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## 2.3 – Taxonomic Ranks

**Definition:**
Taxonomic ranks are groups used to classify organisms from broad to specific levels.

**Ranks in Order:**

1. Domain
2. Kingdom
3. Phylum (or Division)
4. Class
5. Order
6. Family
7. Genus
8. Species

**Example:**
Humans = *Homo sapiens*

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## 2.4 – History of Classification

**Important Points:**

1. **Aristotle**: First to classify organisms as plants or animals.
2. **Al-Jahiz**: Described 350 animal species.
3. **Caesalpinia**: Classified plants by structure.
4. **Tournefort**: Gave concept of class and species.
5. **Linnaeus**: Gave modern 7-level system.

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## 2.4.1 – Classification Systems

- **2-Kingdom**: Plantae & Animalia

- **3-Kingdom**: Protista added
- **5-Kingdom**: Monera, Protista, Fungi, Plantae, Animalia
- **3-Domain**: Archaea, Bacteria, Eukarya

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## 2.5 – Domains of Living Organisms

### 1. Domain Archaea

- Prokaryotes (no nucleus)
- Cell wall has proteins (not peptidoglycan)
- Live in extreme environments
- Example: Methanogens, Halophiles, Thermophiles

### 2. Domain Bacteria

- Prokaryotes with peptidoglycan cell wall
- Live everywhere
- Some are harmful, some helpful

### 3. Domain Eukarya

- Eukaryotes (have nucleus)
- Includes: Protista, Fungi, Plantae, Animalia

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## 2.6 – Kingdoms of Domain Eukarya

### a. Kingdom Protista

- Mostly unicellular
- Three types:
  - Plant-like (e.g. Euglena)
  - Animal-like (e.g. Amoeba)
  - Fungus-like (e.g. Slime molds)

### b. Kingdom Fungi

- Heterotrophs
- Absorb food from surroundings
- Cell wall has **chitin**
- E.g. yeast, mushrooms, molds

### c. Kingdom Plantae

- Autotrophs, make food by photosynthesis
- Cell wall has **cellulose**
- E.g. moss, fern, flowering plants

**d. Kingdom Animalia**

- Multicellular, heterotrophs
- Ingest food
- E.g. fish, birds, mammals, insects

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## 2.7 – Viruses

**Definition:**
Viruses are non-living particles with DNA or RNA and a protein coat. They are not classified like living organisms.

**Important Points:**

1. Viruses are **acellular** (no cells).
2. They need a host to reproduce.
3. Not part of any domain.
4. Examples: Coronavirus, Influenza virus
5. **Prions** (protein only) and **Viroids** (RNA only) are also not included in classification.

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## 2.8 – Binomial Nomenclature

**Definition:**
A system of naming organisms with two Latin names – genus and species.

**Rules:**

1. Two-part name: Genus (capital) + species (small)
2. Use Latin words
3. Italicized or underlined
4. Same name worldwide
5. Example: *Homo sapiens* (for humans)

**Importance:**

1. Avoids confusion of common names.
2. Each name is unique.
3. Universal scientific language.

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